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without calling upon any other effective elements than the "orthodox" factors of inheritance that are located on the chromosomes. In the third place, the theoretical possibility of artificially controlling sex is illuminated. Such control should be possible to the degree that the ordinary heritable characters can be successfully duplicated artificially. The fact that the fourth chromosome (which is known to contain relatively few factors) is preponderant in its influence toward maleness suggests that a few specific factors may be preponderant in influence. Artificial control, therefore, should necessitate the duplication of the effects of only a few of the factors. Also, the identification of particularly effective heritable factors should be followed by the establishment of a race with a heritably distorted sex ratio.—M. C. COULTER.

Taxonomic notes.—BØRGESEN,⁷ in continuation of his studies of the marine algae of the Danish West Indies, has completed the Rhodophyceae. These two concluding parts include 101 species, four of which are new, distributed among 29 genera. The following three new genera are established: *Cottoniella*, *Coelothrix*, and *Hypneocolax*. An extensive appendix (86 pp.) gives a list of the Chlorophyceae, Phaeophyceae, and Rhodophyceae found at the islands, together with addenda and corrections.

ENGLER⁸ and his collaborators, in continuation of their studies of the African flora, have published the following results: ULRICH describes 4 new species of *Pavonia*; MEZ describes 94 new species of grasses, 33 in *Panicum*, 33 in *Melinis*, and 18 in *Digitaria*; ENGLER describes 16 new species of Gesneraceae, 14 of which are in *Streptocarpus*, and also establishes a new genus (*Ctenocladius*) of Moraceae; WOLFF describes 19 new species of Umbelliferae and establishes *Caucaliopsis* as a new genus; KRAUSE describes 8 new species of Liliaceae; IRMSCHER describes 7 new species of Begoniaceae; and BITTER, in continuation of his monograph of African *Solanum*, has reached 56 species.

RYDBERG⁹, in continuation of his work on the Rosaceae, has presented the roses of the Columbia region, which includes Oregon and Washington, together with British Columbia and northern Idaho. In this region he recognizes 37 species of *Rosa* and nine hybrids.

SCHLECHTER,¹⁰ in reorganizing the classification of *Spiranthes*, recognizes 35 species of *Spiranthes* and establishes 16 new genera as follows, chiefly from Mexico, the West Indies, and South America: *Galeottiella*, *Hapalorchis*,

⁷ BØRGESEN, F., The marine algae of the Danish West Indies. Rhodophyceae (5 and 6). Dansk Botanisk Arkiv **3**: 305–498. figs. 308–435. 1919 and 1920.

⁸ ENGLER, A., Beiträge zur Flora von Afrika. XLVIII. Bot. Jahrb. **75**: 161–301. 1921.

⁹ RYDBERG, PER AXEL, Notes on Rosaceae. XIII. Bull. Torr. Bot. Club **48**: 159–172. 1921.

¹⁰ SCHLECHTER, R., Versuch einer systematischen Neuordnung der Spiranthinae. Beih. Bot. Centralbl. **37**: 317–454. 1920.

Beloglottis, *Mesadenus*, *Pseudogooodyera*, *Brachystele*, *Schiedeella*, *Trachelosiphon*, *Deiregyne*, *Gamosepalum*, *Funkiella*, *Cladobium*, *Coccineorchis*, *Lyroglossa*, *Pteroglossa*, and *Centrogenium*.

STAPF¹¹ has established a new genus (*Daturicarpa*) of Apocynaceae from the Belgian Congo. It belongs to the Tabernaemontaneae, and includes three species of shrubs.—J. M. C.

Classification of symbiotic phenomena.—McDOUGALL¹² has written a very sensible and stimulating article on symbiosis and its subdivisions. Very properly he disapproves of the numerous restricted definitions of the term, going back to the original definition of DEBARY, which happens also to be the only definition that justifies the retention of the word in the literature, and the only definition that is etymologically correct. It is one of the curiosities of biological science that so many writers have used the term symbiosis in the sense of mutualism, a relationship that does not exist; and even if it did exist we should not need two terms for the same relationship. The term is much needed, however, in the original and correct sense of "the living together of dissimilar organisms," as pointed out by McDougall, for there is no other term of such broad and general nature. The author's primary division of symbiosis is into disjunctive and conjunctive, each in turn being subdivided into social and nutritive; each type of nutritive symbiosis may be further subdivided into antagonistic and reciprocal. Plant communities illustrate social disjunctive symbiosis; lianas and epiphytes illustrate social conjunctive symbiosis. Antagonistic disjunctive symbiosis is illustrated by herbivores and plants; antagonistic conjunctive symbiosis is illustrated by the ordinary cases of parasitism, such as plant diseases, ectotrophic mycorrhizas, etc. Reciprocal disjunctive symbiosis is illustrated by flowers and pollinating insects, reciprocal conjunctive symbiosis by cases of reciprocal parasitism, such as are seen in lichens, root tubercles, and endotrophic mycorrhizas. McDougall condemns the curious view of some botanists that lichens are simply fungi. He asserts that it is just as absurd to call a fungus-alga combination a fungus as it would be to apply the term fungus to the mycorrhizal combination of roots and fungi.—H. C. COWLES.

Forests of British Columbia.—WHITFORD and CRAIG have published an admirable volume on the forests of British Columbia, which are among the most interesting forests in existence.¹³ The report is based on three years of

¹¹ STAPF, O., *Daturicarpa*, a new genus of Apocynaceae. Kew Bull. no. 4. 166–171. figs. 2. 1921.

¹² McDougall, W. B., The classification of symbiotic phenomena. Plant World 21:250–256. 1918.

¹³ WHITFORD, H. N., and CRAIG., R. D., Forests of British Columbia. Rept. Comm. Conserv. Canada, Committee on Forests. pp. 409. pls. 28. maps 21. Ottawa. 1918.